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(71) Applicant: **Oy Helvar**
**Purotie 3**
**SF-00380 Kauniainen (FI)**

(72) Inventor: **Viljanen, Teijo**
**Kromotie 7**
**SF-02700 Kauniainen (FI)**

(74) Representative: **Hoffmeister, Helmut, Dr.**
**Dipl.-Phys.**
**Patentanwalt**
**Goldstrasse 36**
**D-48147 Münster (DE)**

## (54) Method and apparatus for wireless remote control.

(57) The invention relates to a method and apparatus for wireless remote control. A transmitter (1) with no batteries receives its operating power from a generator (3) which produces electric energy inductively upon turning or pressing an operating element (4) manually. The same operating element can also be used for determining the direction and degree of control.

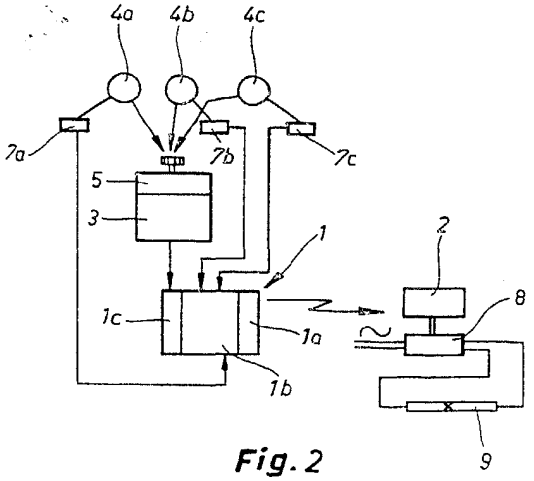


*Fig. 2*

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Generally known are wireless remote controllers based on infrared or radio waves or ultra sound and intended for televisions, lighting, locks etc. Fixedly mounted wireless controllers are also gaining popularity among light controls. The most difficult problem with these involves batteries which must be replaced every few years and which are also environmentally harmful. In order to eliminate batteries it is conceivable to use e.g. a photocell-accumulator assembly. However, this is not functional since, prior to switching on the lights, there is not always light available for recharging the accumulators and, in addition, even accumulators are subject to ageing. In the invention, this problem has been solved by fitting a control-signal transmitter with a manually operated minigenerator for producing necessary electrical energy for transmitting a control signal. The charactsrizing features of the invention are set forth in the appended claims.

The invention can be applied for example in the control and/or regulation of lights. When studying the application of the invention, it was observed that the energy required for turning the knob or pressing the button of a normal light regulator is well sufficient for producing e.g. an infrared transmission. Therefore, it is possible to design a remote control transmitter which resembles a normal mini-controller and also feels that way in handling but can be installed freely without wires almost anywhere.

The invention will now be described in more detail with reference made to the accompanying drawings, in which

fig. 1 shows schematically a design according to one embodiment of the invention and

fig. 2 shows schematically a design according to a second embodiment of the invention.

In the example of fig. 1, the apparatus includes a generator 3 which can be rotated from an operating knob 4 through the intermediary of a gear 5. The electric power produced by the generator 3 is delivered by wires 6 to a transmitter 1 which includes a voltage regulator 1c, a microprocessor 1b and transmitter diodes 1a. The microprocessor 1b is used for encoding a control signal to be transmitted e.g. with an IR-protocol. Naturally, it is also possible to use a signal transmitted by radio waves or ultrasound. The control signal is received by a conventional remote control receiver 2 associated e.g. with a light controller 8.

The generator 3 may comprise e.g. a stepping motor provided with two windings, the pulses supplied by the different windings thereof in conductors 6a and 6b being in phase shift with each other. Thus, the selection of rotating direction for the generator 3 can be used for setting the control direction up or down. The extent and/or speed of rotation of the operating knob 4 can be further used for influencing the rate or degree of a function to be controlled. Thus, in the illustrated example the lights can be switched on and off and, in addition, the level of illumination can be regulated.

The exemplary embodiment of fig. 2 differs from the above in that the turning knob 4 has been replaced by a plurality of press buttons 4a, 4b, 4c. Upon pressing each press button, the generator 3 supplies energy to the transmitter 1. In addition, the press buttons are provided with micro-switches 7a, 7b, 7c for producing various control commands to a microprocessor 1b. For example, the micro-switch 7a issues an up-command and the micro-switch 7b a down-command. The micro-switch 7c may re-establish some preset condition. The receiver 2 controls a light regulator associated e.g. with an electronic ballast 8. Hence, a lamp 9 can be switched on and off by means of a remote controller which is also capable of controlling the level of illumination up and down or selecting a predetermined level of illumination. Also in this case, the different rotating directions of the generator 3 can be used for producing different commands, e.g. up and down, whereby the micro-switches 7a and 7b are not necessary unless further information is required e.g. on the basis of the number of pressing times applied to the same knob.

Said degree of control can be calculated directly from pulses supplied by the generator 3.

In several practical applications it is preferred that the transmitter 1 and generator 3 provide a hand-held control unit.

Naturally, the invention is not limited by the above exemplary embodiments but the design and operation may vary in may ways within the scope of the appended claims. For example, the inductively operating generator can be replaced by a piezoelectrically or triboelectrically operating generator, although in the majority of applications an inductive generator may be the most preferred. The essential feature in the invention is that a transmitter with no batteries receives its operating power from a generator which produces electrical energy upon turning or pressing an operating element in a physical manner, e.g. manually, by the operator.

## Claims

1. A method for wireless remote control, **characterized** in that the electric power required by a transmitter (1) supplying a control signal in a wireless manner to a remote controlled apparatus (2) is produced by means of a generator (3) provided with an operating element

(4) which is operated by the action of physical force from the operator.

2. A method as set forth in claim 1, **characterized** in that the desired control is effected by means of the same operating element (4) as the one used for operating the generator (3).

3. A method as set forth in claim 1 or 2, **characterized** in that the electric power is produced by the generator (3) inductively.

4. A method as set forth in claim 1 or 2, **characterized** in that the electric power is produced by means of a piezo- or triboelectrical generator.

5. A method as set forth in claim 2 or 3, **characterized** in that the generator (3) is operated by turning the operating element (4) and the selection of rotating direction is used for selecting various control commands.

6. A method as set forth in any of claims 2 - 5, **characterized** in that the extent and/or speed of turning the operating element (4) is used for influencing the rate or degree of a function to be controlled.

7. A method as set forth in claim 2, **characterized** in that the generator (3) is operated by pressing an operating element (4a, 4b, 4c) and the selection of a press button (4a, 4b, 4c) is used for selecting various control commands.

8. A method as set forth in claim 7, **characterized** in that various control commands are produced by means of micro-switches (7a, 7b, 7c) associated with said various press buttons (4a, 4b, 4c) operating the generator (3).

9. An apparatus for wireless remote control, **characterized** in that the power source for a control signal transmitter (1) comprises a generator (3) which produces electric energy upon turning or pressing an operating element (4).

10. An apparatus as set forth in claim 9, **characterized** in that the transmitter (1) and generator (3) provide a hand-held control unit.

11. An apparatus as set forth in claim 9 or 10, **characterized** in that the manually operated generator (3) produces electric energy inductively.

12. An apparatus as set forth in claim 11, **characterized** in that the generator (3) comprises a stepping motor provided with two windings and rotatable in both directions, the selection of rotating direction determining whether the control direction is up or down.

13. An apparatus as set forth in any of claims 9-12, **characterized** in that there is a gear (5) between the generator (3) and the operating element (4).

14. An apparatus as set forth in any of claims 9-13, **characterized** in that the operating element for the generator (3) comprises a turning knob (4) or at least one press button (4a, 4b, 4c).

15. An apparatus as set forth in any of claims 9-14, **characterized** in that the operating element for the generator (3) comprises a plurality of press buttons (4a, 4b, 4c) which are provided with micro-switches (7a, 7b, 7c) for producing various control commands.

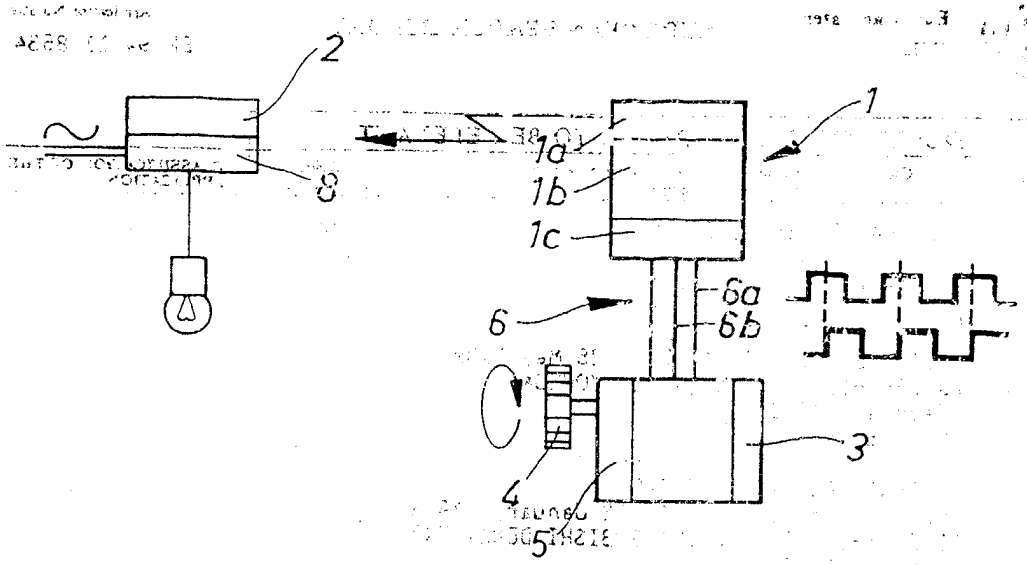


Fig. 1

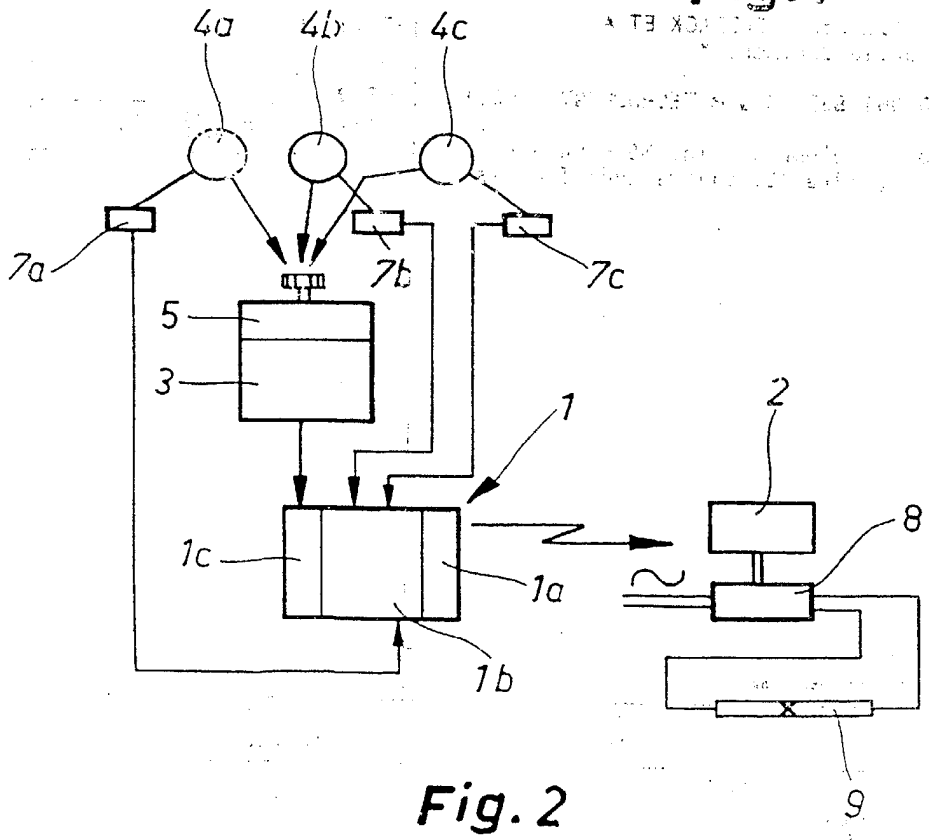


Fig. 2